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File No.: T 0186/92 - 3.4.2  
Application No.: 88 901 124.3  
Publication No.: 0 340 240  
Classification: B01D 23/10  
Title of invention: Filter apparatus and method

**D E C I S I O N**  
of 19 August 1993

Applicant: HENSLEY, Clifford Joe  
Proprietor of the patent:  
Opponent:

Headword:

**EPC:** Art. 56

Keyword: "Inventive step: yes, after amendments"

**Headnote**  
**Catchwords**



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Beschwerdekammern

Boards of Appeal

Chambres de recours

Case Number: T 0186/92 - 3.4.2

**D E C I S I O N**  
of the Technical Board of Appeal 3.4.2  
of 19 August 1993

**Appellant:**

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**Representative:**

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**Decision under appeal:**

Decision of the Examining Division of the European  
Patent Office dated 19 November 1991 refusing  
European patent application No. 88 901 124.3  
pursuant to Article 97(1) EPC.

**Composition of the Board:**

**Chairman:** E. Turrini  
**Members:** R. Zottmann  
M.V.E. Lewenton

**Summary of Facts and Submissions**

I. European patent application No. 88 901 124.3 with publication No. 0 340 240 was refused by decision of the Examining Division.

The reason given for the refusal was that no inventive step could be seen in the subject-matters of the independent claims, having regard to document

D1: US-A-4 496 464

and the general knowledge of the skilled person.

II. The Appellant (Applicant) lodged an appeal against said decision.

III. In a communication pursuant to Article 110(2) EPC, the Board expressed its preliminary opinion that the application did not meet the provisions of the EPC and informed the Appellant by which amendments the existing deficiencies could be removed.

IV. To meet these objections, the Appellant filed amended claims and a correspondingly adapted description.

V. The Appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the following documents:

Claims: Nos. 1 to 11 as filed with letter of  
7 May 1993;

Description: page 1 and page 2, paragraphs 1 to 4 as  
filed with letter of 7 May 1993;

page 2 - to be renumbered to 2a - lines 9 to page 3 and pages 5 to 7 as filed with letter of 8 July 1993; and pages 4 and 8 to 10 of WO-A-8 804 951;

Drawings: sheet 1/3 as filed with letter of 8 July 1993; and sheets 2/3 and 3/3 of WO-A-8 804 951.

VI. Claims 1 and 6 according to the Appellant's request read as follows:

"1. Method of filtering contaminants from a stream of liquid comprising the steps of:

(1) placing a screen within a vessel through which liquid can flow,

said screen separating the vessel into an upper chamber and a lower chamber, being shaped to form a central apex and having a surface area which is a significant proportion of the cross sectional area of the vessel;

(2) placing a filter media onto and upstream of said screen thereby partially filling said upper chamber of the vessel,

said media being made of a multiplicity of discrete pieces of filter material which substantially will not pass through said screen;

(3) flowing contaminated liquid into the upper chamber of the vessel above the media, through the media, through the screen and through an outlet of the vessel while the contaminant is deposited on the media, and carrying out the step until the load of the contaminant removed by the filter media produces a pressure drop

which is significantly greater than the pressure at the commencement;

(4) cleaning the media of most of the deposited contaminants while the media remains within the upper chamber of the vessel, by carrying out the following steps:

(a) placing the suction of a pump in communication with the liquid contained within the upper chamber of the vessel;

(b) placing the discharge of said pump within the upper chamber of the vessel in spaced relationship respective to said pump suction and such that it is faced by said central apex of the screen;

(c) flowing liquid contained within the vessel into the pump suction, through the pump discharge and across the screen at a rate to cause substantially all of the liquid and the media to be agitated with great force and to flow along a path which describes a toroid, thereby scrubbing the media while the media is contained within the upper chamber above the screen and causing most of the contaminants to be translocated from the media into the liquid;

(d) discharging the liquid laden with contaminants from said upper chamber through said screen and said vessel outlet while flowing relatively uncontaminated liquid into the upper chamber of the vessel until most of the suspended contaminants have been removed from the vessel;

(5) reducing the velocity of flow to a value which enables the media to settle into a filter bed; and

(6) repeating step (3)."

"6. Filter system for removing contaminants from a liquid flowing through the system comprising

a vessel (12) having an inlet (54) for providing a contaminated liquid flow into one end thereof and an outlet (55) through which filtered liquid can exit said vessel,

a screen (34, 134, 234, 334) supported adjacent said outlet (55), separating the vessel into an upper chamber and a lower chamber (50) and having a surface area which is a significant proportion of the cross sectional area of the vessel;

a quantity of particulate filter media partially filling said upper chamber of the vessel and being supported upstream on said screen for normal filter operation wherein contaminants are captured by said particulate filter media and filtered liquid exits through the screen, said lower chamber and said outlet of said vessel;

a periodically operable scrubber apparatus (20-30) adapted to cause substantially all of the liquid and the media in the upper chamber to be agitated with great force and to flow along a path which describes a toroid, said scrubber apparatus including a pump (20) having a suction inlet (26) within the upper chamber of the vessel, above said media and in spaced relationship respective to a pump outlet nozzle (28) in said upper chamber; and a means for removing the liquid laden with contaminants from said upper chamber while flowing relatively uncontaminated liquid into the upper chamber of the vessel until most of the suspended contaminants have been removed from the vessel,

**characterized in that**

said screen (34, 134, 234, 334) is shaped to form a central apex (38, 138);

said outlet nozzle (28) is directed toward said apex of said screen; and

said means for removing the liquid laden with contaminants is adapted to remove said liquid from said upper chamber of said vessel through said screen (34, 134, 234, 334) and said vessel outlet (55)."

Claims 2 to 5 are dependent on Claim 1 and Claims 7 to 11 are dependent on Claim 6.

**Reasons for the Decision**

1. The appeal is admissible.
2. *Allowability of the amendments (Article 123(2) EPC)*

In the Board's opinion, there are no objections under Article 123(2) EPC to the amendments of the claims, the description and the drawings since they do not introduce subject-matter not contained in the application as originally filed.

3. *Novelty*

After examination of document D1 and the further documents of the Search Report, the Board has reached the conclusion that the subject-matters of Claims 1 and 6 are novel. Since in the decision under appeal the Examining Division accepted novelty of the

subject-matters of the independent claims and since the scopes of protection of the independent claims on which the present decision is based is narrower than those of the independent claims on which the decision under appeal is based, it is not necessary to give detailed reasons for this finding.

4. *Inventive step*

4.1 It is undisputed that the prior art disclosed in document D1 and particularly the embodiment of Figure 11 of D1 is the nearest prior art with respect to the subject-matter of Claim 1.

4.2 The filtering methods taught in said embodiment of D1 on the one hand and according to Claim 1 on the other hand are quite similar except for the form of the screen extending across the vessel and, as a consequence, the alignment of the discharge of the pump and the way through which the liquid laden with contaminants leaves the upper chamber of the vessel during discharge step.

Those differences of Claim 1 and the nearest prior art are in detail: According to said embodiment (see in D1 particularly Figures 1 to 3, 10 and 11 and corresponding description), the liquid laden with contaminants is removed from the upper chamber of the vessel (12) through a second (scrubbing) screen (42) and an - extra - discharge outlet (44) of the vessel, but not through the outlet (24/124) of the vessel provided for the cleaned liquid during normal filter operation. To establish a toroidal flow pattern during the cleaning step, a guide means (circulation guide 34 with guide inlet 36, annulus 38, guide outlet 40 and outer barrel 50) is mounted above the filter media (20). The first screen (164) through which only the cleaned liquid is flowing is a flat plate screen. Contrary to that,

according to the Claim 1 of the application in suit, the liquid laden with contaminants is removed from the upper chamber through a single screen and the outlet of the vessel provided for the cleaned liquid during normal filter operation. Thus this - single - screen performs a dual function and does not necessitate the two screens of D1. To establish a toroidal flow pattern during the cleaning step of Claim 1 of the application in suit, the screen is shaped to form a central apex to which the discharge of the pump is directed.

These differences have the effect that the filter method according Claim 1 of the application in suit is simpler and cheaper, but not less effective.

4.3 The objective problem to be solved by the invention was therefore to further develop the method known from D1 in such a manner that the above-mentioned effects were obtained.

Apparently, it was obvious for the skilled person to pose such a problem.

4.4 The special nature of the cleaning step of D1 is essential to that known method. This follows particularly from the fact that all embodiments and all method claims comprise the corresponding features. To arrive at the solution according to Claim 1 of the application in suit, when starting from D1, a fundamental change of said step would have been necessary. D1 does not give any hint for such a considerable change of the cleaning step. Moreover, the skilled person would not have provided a single screen for both filtration and scrubbing except in hindsight from a reading of D1 since the skilled person could not expect that the (then single) flat screen (164) of D1 suitable for normal filter operation could substantially

be freed from media during the cleaning step as this is the case with the scrubbing screen assembly (34-42). Such a removal of the (contaminated) media is, however, a prerequisite for effective cleaning of the contaminated media and quick removal of the contaminants and backwash liquid through the screen. To solve this problem, a further measure would have been necessary, namely provision of a central apex of the screen faced by the outlet nozzle of the pump. D1 does not even suggest such a measure. The screens shown in D1 and corresponding to the single screen of the application is either a flat plate screen (Figure 11) or consists of parallel tubes with slots (Figures 1 to 5, 8 and 9).

To solve said problem the person skilled in the art would not take into account the other documents of the Search Report since they describe filter methods which are quite different from that of D1. According to GB-A-2 021 428, GB-A-9 668 and US-A-519 135, filtrate and backwash liquid laden with contaminants leave the filter vessel at opposite ends of the vessel. Backwash liquid laden with contaminants does not flow through the screen. In DE-A-1 038 528 pressurised air permanently transports some contaminated filter media in channels from the bottom of the filter vessel to the surface of the media. Moreover, the teachings of said documents, if nevertheless taken into account when solving the problem as indicated in point 4.3 above, would not lead to a solution according to Claim 1.

4.5 In view of the foregoing, the subject-matter of Claim 1 involves an inventive step in the sense of Article 56 EPC.'

4.6 Independent apparatus Claim 6 contains features corresponding to the features of independent method

- Claim 1 and, therefore, involves likewise an inventive step.
5. Since Claims 1 and 6 meet the requirements of Article 52(1) EPC when taking into account the prior art on file and the other requirements of the EPC, they are allowable.
  6. Dependent Claims 2 to 5 and 7 to 11 refer to particular embodiments of the invention as defined in Claim 1 and, respectively, Claim 6. They are, therefore, likewise allowable.
  7. Therefore and since the description and the drawings meet the requirements of the EPC, a European patent can be granted.

## Order

### For these reasons, it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to grant a patent on the basis of the following documents as agreed by the Board of Appeal:

Claims: Nos. 1 to 11 as filed with letter of  
7 May 1993;

Description: page 1 and page 2, paragraphs 1 to 4 as  
filed with letter of 7 May 1993;

page 2 - to be renumbered to 2a - lines 9  
to page 3 and pages 5 to 7 as filed with  
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Drawings: sheet 1/3 as filed with letter of 8 July  
1993; and  
sheets 2/3 and 3/3 of WO-A-8 804 951.

The Registrar:

The Chairman:

E. Görgmaier

E. Turrini